Title: Self-esteem in children after traumatic brain injury: An exploratory study

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Abstract

Children with a traumatic brain injury (TBI) often have difficulties in adjusting to their injury and altered abilities, and may be at risk of low self-esteem and loss of confidence. However, few studies have examined self-esteem in this client group. The current study measured the self-esteem of a group of children who were, on average, two years post-TBI and compared this to their performance on other psychometric measures.

Participants were 96 children with TBI and 31 peer controls, their parents and teachers. Self-esteem was measured using the Coopersmith Self-esteem Inventory (CSEI). CSEI scores were compared with performance on Wechsler Intelligence Scales (WISC-III), Hospital Anxiety and Depression Scale (HADS); Children's Memory Scale (CMS), Vineland Adaptive Behaviour Scales (VABS) and Parental Stress Index (PSI).

Self-esteem was highly correlated with IQ; HADS anxiety and depression; and parental stress ($p<0.001$). Children with TBI had significantly lower self-esteem than controls and population norms ($p=0.015$).

Many children with TBI demonstrate low self-esteem and this is closely linked with anxiety and depression. This may hamper academic performance and could lead to further psychosocial problems. It is recommended that self-esteem is routinely assessed after brain injury and rehabilitation strategies implemented to promote a sense of self-worth.

Introduction

Children with traumatic brain injury (TBI) often exhibit behavioural problems and have difficulty with school performance and maintaining friendships (Anderson, et al, 2001, Hawley, et al 2004, Hawley, 2004). Feelings of falling behind in school class, or not being as popular as before the injury are likely to have a negative impact on self-esteem. However, assessment of self-esteem does not always form part of routine clinical assessments and thus may remain unaddressed.

The child development literature shows that development of self is not complete and integrated until early adulthood (Harter, 1999), and that social, environmental and biological factors influence the integrated sense of self which develops throughout childhood (Sigelman and Rider, 2003). In middle childhood the child starts to make comparisons about his/her competencies and becomes able to define him/herself as being 'like' or 'unlike' others (Sigelman and Rider, 2003, Miller, 2002, Eccles, 1999). In normal development, therefore, children develop a sense of self and self-worth by comparing themselves to their peers and absorbing the feedback they receive from significant people in their lives.

Self-esteem is a socially derived construct. It is a product of many factors: confidence, self-image, self-awareness, self-respect, attitudes, values and self-worth. Children develop self-esteem based on how they are treated by significant people in their lives such as parents, grandparents, siblings, teachers and peers, and by evaluating their own performance and capabilities with those of others (Coopersmith, 1967). When a child has a brain injury their sense of self and self-esteem may require re-evaluation to take account of their altered circumstances. However, TBI is associated with a lack of self-awareness or insight, and difficulties in seeing the world from the point of view of others. It is likely then that self-esteem may be negatively affected among children with TBI and that children with TBI have lower self-esteem than non-injured children.

Previous research has shown that many factors in the child's life affect self-esteem. Several authors have associated self-esteem with parental behaviours, parental support and parenting style (Felson and Zielinski, 1989; Gecas and Schwalbe, 1986; Glia, et al, 2010). Peer relationships also have an effect on self-esteem (Cobb, et al,

1998). Self-esteem is also linked to academic achievement, with poor academic performance being associated with lower self-esteem (Marsh et al, 1988; Marsh and O'Mara, 2008; Ross and Broh, 2000). It has been argued that self-esteem in children is closely linked to school performance as this provides them with a tangible measure of their capabilities compared with their peers (Coopersmith, 1981).

Although self-esteem has been well studied in children, a review of the literature found only one study to have examined self-esteem in children with brain injury. Andrews et al (1998) explored social and behavioural effects of TBI in children, and demonstrated significantly lower levels of self-esteem in a small sample of children with TBI compared with controls.

Objectives: The current study will measure self-esteem in a cohort of children with TBI and compare this to their performance on measures of behaviour, intelligence, learning, emotions and anxiety. Self-esteem will also be compared with teacher assessments of the child's behaviour and school performance. It is hypothesised that children with TBI will demonstrate lower self-esteem than non-injured controls.

Methods

Study Group

A group of 525 children who had suffered a traumatic brain injury were identified through a Head Injury Register at a regional trauma centre. Children injured up to 5 years before the start of the study were included. All children had been admitted to hospital for at least 24 hours following their TBI. Injury severity was determined according to the British Society of Rehabilitation Medicine (1998) classification: Severe = an injury causing unconsciousness for >6 hours and a Glasgow Coma Scale (GCS) after initial resuscitation of 3-8; Moderate = unconsciousness between ≥15 minutes and <6 hours and a GCS after initial resuscitation of 9-12; Mild = unconsciousness for <15 minutes and a GCS after initial resuscitation of 13-15.

Of the 525 children, 49 had suffered severe, 57 moderate, and 419 mild TBI. The parents of all children were contacted by post and invited to take part in the study. The study aimed to recruit up to 100 families, comprising similar numbers of children

with mild, moderate and severe TBI. Parents of 139 children agreed to take part, 29 with severe (59%), 19 with moderate (33%) and 90 with mild TBI (22%). In the mild group, 49 of the 90 volunteers were recruited to match the moderate and severe groups in terms of age, sex, and time since injury. One child in the severe group was unable to complete a self-esteem assessment, giving a total of 96 study participants: 28 (29%) severe, 19 (20%) moderate, and 49 (51%) mild.

Ethical approval for the study was granted by the North Staffordshire National Health Service research ethics committee.

Parents and children who consented to take part were asked to nominate a child in their school class, or if not in school a friend of the same age and gender, to act as a control. Sixty-two families identified a control child, and 31 of these (50%) agreed to participate in the study, none had a history of head injury, nor any neurological impairment. All consenting control families were interviewed and assessed.

Neuropsychological assessments were carried out by Assistant Psychologists under the supervision of a Consultant Clinical Psychologist, either in the Psychology Department or in the child's home. Interviews with parents and the child were carried out in the child's home by one of two trained interviewers with a background in psychology and social work. Children still attending school also consented to their teachers being contacted by the research team. Teachers were asked to complete a postal questionnaire which asked about the child's self-esteem and self-confidence.

Measures:

Self-esteem

The Coopersmith Self-Esteem Inventory (School Form) (Coopersmith, 1967, 1981) has good internal consistency, reliability and validity and has been widely used in the field of educational research. It is a 50 item scale which measures general self-esteem and also has four sub-scales which measure general self; social self; home-parents, and school-academic. There is also an 8 item 'lie' scale which measures defensive or socially desirable ratings. The scale has a maximum score of 100 and

minimum score of 0. Higher scores indicate higher self-esteem. The mean normative score is 70 with standard deviation (SD) of 11 (Coopersmith, 1981).

Intelligence

The Wechsler Intelligence Scale for Children – Third Edition UK (WISC-III) (Wechsler, 1991) is a widely used measure for assessing general intelligence. Full Scale Intellectual Quotient (FSIQ), Verbal IQ (VIQ), and Performance IQ (PIQ) were used in the analysis.

Learning and Memory

The Children's Memory Scale (CMS) (Cohen, 1997) provides a systematic assessment of learning and memory in children and adolescents. The scale provides a global measure of memory function (General Memory Index (GMI)) and seven further index scores. Here the GMI and Learning index scores (ability to learn) were used in the data analysis. A score of 100 represents an average performance for a given age-group.

Anxiety and Depression

The Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith, 1983) measured anxiety and depression in children aged 9 or over. Items are rated on a four-point scale ranging from absence of a symptom to maximum symptomatology. The scale provides a score for both anxiety and depression. The clinical significance of anxiety or depression is calculated on a scale whereby scores of 0-7 are non cases, 8-10 are borderline cases, and scores of 11-21 indicate cases (Zigmond and Snaith, 1983).

Parental Stress

The Parenting Stress Index Short Form (PSI/SF) (Abidin, 1995) was used to measure the level of stress suffered by the primary carer, usually the mother. The PSI/SF measures stress over four domains: parental distress (PD); parent-child dysfunctional interaction (P-CDI); difficult child (DC); and total stress (TC). A high score on the Difficult Child domain indicates that the child demonstrates difficult, defiant and demanding behaviour. A high score on the P-CDI domain suggests that the parent-child bond is threatened or has never been adequately established.

Behaviour

The Vineland Adaptive Behaviour Scales (VABS) Interview Edition, Survey Form (Sparrow et al, 1984) were used to assess maladaptive behaviour amongst children with TBI and controls. The VABS relies on parental report. Raw scores on the Maladaptive Behaviour Domain were converted into age-adjusted maladaptive levels according to published norms.

Social deprivation

The Townsend Deprivation Index (Townsend et al, 1986) was used to measure social deprivation amongst the study group, using postal codes. The higher the positive score the more deprived an area, and the higher the negative score the more prosperous. For the UK, the mean score is zero, North Staffordshire has higher deprivation than the national average with a mean score of +1.24.

Statistical Analysis

All data were analysed using the statistical package for the social sciences (SPSS v. 18). Spearman's rho correlation coefficients were calculated to examine relationships between non-parametric independent variables. In order to examine differences between severity and control groups for self-esteem, IQ and CMS, means were compared using the independent samples t-Test. Analysis of variance (ANOVA) was carried out with Bonferroni's post-hoc test for multiple comparisons. Pearson Chi-Square cross-tabulations of categorical data were used to examine the characteristics of children demonstrating high self-esteem. The moderate and severe TBI groups were combined to form one group for some analyses.

Results

Participants

Of the 96 children in the TBI group two thirds (64, 66.7%) were male, and 99% were white (consistent with the ethnicity of the local population which is 98% white). At the time of the injury the participants were aged between 5 and 15 years. The mean age was 9.85, SD = 3.12. At the time of the interviews ages ranged from 6 to 20 years.

Table 1 shows demographic characteristics for each severity group and the control group.

Social Deprivation

Compared to the national average score of zero, study participants came from more deprived areas. In both TBI and control groups two thirds of families lived in areas with positive (more deprived) scores. In the TBI group, the mean score was +1.24, SD = 2.84, with a range of –5.14 to +8.29. In the control group the mean score was –0.16, SD = 2.69, with a range of –4.93 to +5.1.

Self-Esteem

There was no difference in mean CSEI scores for males and females, and there was no association between age and self-esteem. Control children demonstrated significantly higher self-esteem than children with TBI. Controls: mean = 76.71 (SD = 15.79), TBI group: mean = 67.54 (SD = 18.71), t = 2.46, p = 0.015, 95% CI: 1.79 to 16.55). Figure 1 shows the distribution of scores as box plots for each severity group and controls. An ANOVA of group (control, mild TBI or moderate/severe TBI) x total CSEI and sub-scales found significant differences between the control group and moderate/severe TBI group for total CSEI, general self-esteem and home self-esteem. Table 2 presents the results. Defensive responding on the 'lie' scale showed no differences between the TBI and control group.

Teachers rated each child on two questions: 'does the child exhibit low self-esteem' and 'does the child lack confidence' using a three point scale of 'not at all', 'occasionally' and 'frequently'. Teacher ratings were strongly negatively correlated with the CSEI and all sub-scales. Teacher-rated 'low self-esteem' significantly correlated with total CSEI (-0.507, $p<0.0001$), school S-E (-0.411, $p<0.0001$), general S-E (-0.431, $p<0.0001$), social S-E (-0.322, $p<0.0001$) and home S-E (-0.466, $p<0.0001$). Teacher-rated 'lacks confidence' was significantly correlated with total CSEI (-0.353, $p<0.001$), school S-E (-0.275, $p<0.012$), general S-E (-0.184, $p<0.010$), social S-E (-0.256, $p<0.020$) and home S-E (-0.290, $p<0.008$).

Total CSEI was positively correlated with IQ (but not performance IQ), CMS memory and learning scales. CSEI was negatively correlated with HADs anxiety and depression, Vineland maladaptive behaviour scale, and parenting stress (Table 3). Correlations for the TBI group and the control group were performed separately. Correlations for the TBI group are shown in Table 3. For the control group none of the assessments were significantly correlated with CSEI.

An ANOVA of study group (TBI or control) x WISC, CMS, and CSEI was performed. Results are presented in Table 4. Post-hoc tests showed that there were significant differences between the control and moderate/severe groups for WISC and CSEI (control children were not assessed on the CMS).

Characteristics of the 48 children who demonstrated high self-esteem (total CSEI score >80) were examined. Children with high self-esteem were: 19 in the control group (61%), 15 (31%) in the mild TBI group, 7 (37%) moderate, and 7 (25%) severe. High self-esteem was associated with a low incidence of emotional problems (X^2 = 15.24, p = 0.0001), low scores on the HADs anxiety scale (X^2 = 36.55, p = 0.0001) and HADs depression scale (X^2 = 26.40, p = 0.0001), and low levels of parental stress (X^2 = 40.34, p = 0.0001).

Discussion

Overall, children who had a brain injury demonstrated lower self-esteem than control children and the normal population. However, a quarter of those with severe TBI demonstrated very high self esteem. Overall, children with high self-esteem were characterised by few emotional problems and having parents with lower levels of stress than parents of children with low self-esteem. The presence of physical problems had no effect on level of self-esteem. Other children showed very low self-esteem which was significantly associated with high levels of anxiety and depression. Depression has already been associated with self-esteem by other investigators. Orth et al (2008) found that low self-esteem predicts depression in adolescents. In a review of the literature Nilsson et al (2010) concluded that low self-esteem is a risk factor for depression.

High self-esteem among some children with TBI may be partially explained by a lack of awareness of their capabilities compared with their peers. The CSEI asks children to state whether a characteristic is 'like me' or 'unlike me', for example 'I am easy to like'. It is therefore possible that some children with TBI may lack the necessary self-awareness to make accurate judgements. The assessment of self-awareness in children is difficult, and none of the measures used here provided an estimate of self-awareness. All children in the study had a chronological age which was sufficiently high to complete the CSEI measure, but some were injured as young as 5 years old and their developmental age may have been reduced following their brain injury. Interrupted development is known to have a negative impact on social and academic functioning which in turn could affect the development of self-awareness (Anderson, et al, 2009; Babikan and Asarnow, 2009; Harter, 1999).

As previously mentioned, parental support and parental behaviour has been linked with self-esteem in 'normal' children (Openshaw, et al, 1984; Felson and Zielinski, 1989). In our TBI group, self-esteem was strongly correlated with parental scores on the Parenting Stress Index. In particular, high scores on the domains of parent-child relationship and difficult child were very highly correlated with low self-esteem. Our previous work identified very high levels of parental stress among parents of children with mild, moderate and severe TBI (Hawley, et al, 2003).

Taylor and colleagues (2010) found that children who had special educational needs (SENs) and were labelled as such in school, had significantly lower self-esteem than children labelled as having dyslexia or children with no learning difficulties. In the current study, some children with TBI had been identified with SENs and others were labelled as 'brain injured'. This may well have had a negative effect on their self-esteem. Unless they are informed about brain injury, and they rarely are, peers can be unkind to children with TBI which can lead to reduced confidence and self-esteem.

Following TBI, a child may increasingly fall behind his/her peers academically with a resulting slow but steady decline in self-esteem (Appleton and Baldwin, 1998). Children with any form of learning difficulties are at risk of lowered self-esteem because they are likely to experience repeated failure at school (Meyer, 1983). In the current study, teacher ratings of self-esteem and lack of confidence were largely

in agreement with the child's self-reported CSEI scores. This illustrates the importance of teachers in assessing pupils. However, teachers are not always aware that the child had a brain injury, especially if the injury occurred during a prior school year or at a previous school (Hawley et al, 2004). Some teachers may unwittingly contribute to reduced self-esteem by reprimanding the child for poor school performance or behavioural problems, when these may in fact be a defence mechanism of the child to cope with reduced academic abilities (Ylvisaker and Feeney, 1998). As the self-esteem of a child with TBI is linked to school performance, schools should be involved in rehabilitation and long-term follow-up. Community outreach programmes such as the Paediatric Acquired Brain Injury Community Outreach Program (Gillett, 2004), offer rehabilitation and support for the family and also work with schools and classmates to help the injured child to re-integrate in school.

This study found that behavioural problems were negatively correlated with self-esteem, thus children with higher self-esteem had fewer behavioural problems. These findings are consistent with those of other investigators. Tremblay and colleagues (1992) found that children with behavioural problems are vulnerable to low self-esteem because of the negative feedback they receive for their behaviours. However, in a study of children without brain injury, Stanley, Dai and Nolan (1997) used the CSEI to compare children with learning difficulties with those who had behavioural difficulties. They found that children with behavioural problems reported unrealistically high self-esteem, whereas the children with learning difficulties reported lower self-esteem. Both groups reported mild depression, with the authors concluding that both groups would benefit from intervention. Consequently, the relationship between self-esteem and behavioural difficulties warrants further investigation.

Study Limitations

One third of the children with moderate TBI and fewer than one quarter of children with mild TBI took part in the study. It is possible that some of the parents, particularly in the mild group, volunteered because they had particular concerns

about their child following the TBI. Consequently, study participants may not be representative of all children with TBI.

Conclusion

The results of this study support the hypothesis that children with TBI have lower self-esteem than non-injured controls. High self-esteem was associated with higher intelligence and good emotional health. Low self-esteem was associated with parental stress and behavioural problems. As self-esteem and self worth are important to personal growth and healthy development, it is recommended that self-esteem is assessed regularly so that children with low self-esteem after TBI can be identified and supported in the community and in school. Health professionals and teachers should focus on strengths rather than weaknesses in order to boost low-self-esteem. Future research should examine self-esteem in a larger representative sample of children with TBI, and investigate the relationship between self-awareness and self-esteem.

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Table 1 Demographics and Injury Characteristics

Variable	Mild n = 49	Moderate n = 19	Severe n= 28	All TBI n = 96	Control n = 31
Gender: number male (%)	32 (65.3%)	15 (78.9%)	17 (60.7%)	64 (66.7%)	18 (58.1%)
Age at injury (years)					NA
Mean	9.43	9.58	10.72	9.89	
SD	3.08	3.37	2.96	3.12	
Age at first interview (years)					
Mean	12.72	13.13	13.84	13.15	12.1
SD	3.43	3.95	3.42	3.53	3.16
Time of injury to interview (years)					NA
Mean	2.33	2.68	1.97	2.29	
SD	1.52	1.60	1.50	1.53	
Mechanism of injury					*N/A*
Fall (%)	22 (44.9%)	4 (21.1%)	2 (7%)	28 (29.2%)	
RTA* pedestrian (%)	9 (18.4%)	5 (26.3%)	16 (57.1%)	30 (31.3%)	
RTA* within vehicle (%)	0	2 (10.5%)	4 (14.3%)	6 (6.2%)	
RTA* cyclist (%)	4 (8.2%)	0	3 (10.7%)	7 (7.3%)	
Fall from bicycle (%)	8 (16.3%)	2 (10.5%)	0	10 (10.4%)	
Assault (%)	1 (2%)	2 (10.5%)	0	3 (3.1%)	
Object	4 (8.2%)	1 (5.3%)	1 (3.6%)	5 (5.2%)	
Other	1 (2%)	3 (15.8%)	2 (7%)	7 (7.3%)	
Total	49 (100%)	19 (100%)	28 (100%)	96 (100%)	

*Road Traffic Accident

Table 2 Coopersmith Self-Esteem Inventory: ANOVA of injury group/controls

CSEI Domain	**Control (n=31)**	**Mild (n=49)**	**Moderate /Severe (n=47)**	**F**	**Significance**
Total S-E mean	76.71	69.39	65.62	3.546	0.032*
SD	15.79	17.05	20.31		
Range	40 - 96	22 - 94	26 – 100		
General S-E mean	39.55	35.02	33.02	4.020	0.020*
SD	7.88	9.88	11.32		
Range	18 - 48	10 - 50	8 – 52		
Social S-E mean	12.77	12.57	11.40	1.744	0.179
SD	3.25	3.19	4.31		
Range	6 - 16	0 - 16	0 – 16		
Home S-E mean	13.16	11.63	10.89	3.455	0.035*
SD	3.26	3.82	3.95		
Range	2 - 16	2 - 16	0 – 16		
School S-E mean	11.23	10.16	10.30	0.714	0.492
SD	3.92	4.02	4.23		
Range	2 – 16	2 – 16	2 – 16		
Lie Scale mean	3.58	3.61	3.40	0.300	0.741
SD	1.31	1.39	1.39		
Range	1 - 6	1 - 6	1 - 7		

* significant at the <0.05 level

Table 3 Correlations between Coopersmith Self-Esteem Inventory (CSEI) and assessment variables (TBI Group)

Assessment Variables	Total CSEI	Significance level	N
WISC Full Scale Intelligence Quotient	0.404	0.001**	68
WISC Verbal Intelligence Quotient	0.425	0.0001**	68
WISC Performance Intelligence Quotient	0.226	0.064	68
Children's Memory Scale General Memory	0.313	0.007**	73
Children's Memory Scale Learning	0.290	0.013*	73
Hospital Anxiety & Depression Scale Anxiety	-0.651	0.0001**	88
Hospital Anxiety & Depression Scale Depression	-0.633	0.0001**	88
Vineland Maladaptive Behaviour	-0.448	0.0001**	87
Parenting Stress Index Total Stress	-0.580	0.0001**	95
Parenting Stress Index Parent-Child relationship	-0.498	0.0001**	95
Parenting Stress Index Difficult Child	-0.569	0.0001**	95
Teacher Assessment			
Teacher reported low self-esteem	-0.507	0.0001**	82
Teacher reported lacks confidence	-0.353	0.001**	82

* denotes significant correlation at the <0.05 level (2-tailed).

** denotes significant correlation at the <0.01 level (2-tailed).

Table 4 Wechsler Intelligence Scale, Children's Memory Scale and Coopersmith Self-Esteem Inventory: ANOVA of injury group/controls

Assessment	**Control (n=31)**	**Mild (n=49)**	**Moderate /Severe (n=47)**	**F**	**Significance**
WISC Full Scale Intelligence Quotient				5.514	0.005**
mean	100.04	88.14	79.91		
SD	19.78	23.34	25.69		
WISC Verbal Intelligence Quotient				4.159	0.019*
mean	99.26	89.0	85.91		
SD	715.25	16.42	22.46		
WISC Performance Intelligence Quotient				4.507	0.014
mean	98.52	95.56	85.72		
SD	15.17	16.01	20.59		
Coopersmith Self-Esteem Total Self-Esteem mean	76.71	69.39	65.62	3.546	0.032*
SD	15.79	17.05	20.31		
Children's Memory Scale mean	N/A	94.0	71.65	6.882	0.002**
SD		29.42	38.01		

* significant at the <0.05 level

** significant at the <0.01 level

Figure 1: Boxplots of Self-Esteem Scores and Severity Group